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The Association Between Learning Styles and Academic Difficulty

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THE ASSOCIATION BETWEEN LEARNING STYLES AND ACADEMIC DIFFICULTY

THESIS

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By

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CHAPTER I
STATEMENT OF THE PROBLEM

Purpose of the Study

The purpose of this study was two-fold: to determine whether there is a significant association between a student's dominant Jungian learning style and the occurrence of academic difficulty, and to determine whether there is a significant association between learning style and the intensity of academic difficulty.

The researcher sought answers to the following questions:

1. Is there a statistically significant association between learning style and academic difficulty?

2. Is there a statistically significant association between learning style and the intensity (remedial versus Special Education) of academic difficulty?

Need for the Study

"Identifying learning styles as a basis for providing responsive instruction has never been more important than now, as educators meet the needs of a diverse student population" (Dunn, Beaudry & Klavas, 1989, p. 56). A wealth of research has shown that a student's ability to concentrate and to learn improves when his or her learning style is matched with appropriate instructional strategies. This research indicates that many at-risk students have learning styles different from the styles needed to succeed in traditional educational settings (Carbo, Dunn, & Dunn, 1986). Because so many students are in need of additional academic assistance, the regular classroom must adapt to meet the needs of a large population of students. Educators need to be aware of learning styles and teach to them, if they are to offer their students a fair educational experience.

According to Dunn (1990), curriculum is not the reason students are failing. She believes that when students are taught with methods and approaches that correspond to their learning style strengths, students can learn almost any subject matter. "When students cannot learn the way we teach them, we must teach them the way they learn" (p. 18). Similarly, O'Neil (1990) contends that matching teaching efforts with students' learning styles promotes achievement and self-confidence. After being shown how to study and to do homework

utilizing their learning style strengths, students at many institutions and at varying academic levels demonstrate significant increases in academic achievement, improved attitude towards school, less tension in classes, and significant increases in school retention (Dunn, Deckinger, Withers, & Katzenstein, 1990).

When asked in a 1998 interview how important learning styles will be in the year 2000, Dunn explains that learning styles are likely to become a mandated prerequisite for schooling within the next decade. She attributes this to the significantly higher reading and mathematics achievement test scores of previously failing and poorly achieving students in the United States after their learning styles were addressed (Shaughnessy, 1998).

According to Hanson, Silver, and Strong (1991), one of the most widely accepted ways of classifying learning styles is the Jungian system. Unfortunately, little empirical data exist based on this specific model. With Jung's model being used by many schools in the movement to teach to learning styles, there is a need for extensive research on the utility of this model in the American classroom.

Definition of Terms

Learning Preference Inventory: Developed by Silver Strong and Associates, the Learning Preference Inventory (LPI) is a brief diagnostic assessment of how

students perceive themselves as learners. Based on Jung's Psychological Types, this assessment identifies individual student's learning preferences and styles.

Occurrence: One of the two factors used to characterize academic services. Occurrence refers to whether or not a student has ever received additional academic services.

Intensity: One of the two factors used to characterize academic services. Intensity consists of three sub-factors including severity, duration, and pervasiveness of the additional academic service received.

Severity: One of the three categories of intensity. Severity refers to the degree of academic support, either remedial or special education.

Duration: One of the three categories of intensity. Duration refers to the number of years a student received additional academic services.

Pervasiveness: One of the three categories of intensity. Pervasiveness refers to the number of additional academic service types a student received.

Supplemental Remedial Reading Program: For students with minor reading problems. Students' eligibility is based on teacher recommendation and/or scoring below 50th percentile on the New York State assessment protocol. It is intended to provide academic support for students in need of additional concept and/or skills reinforcement in reading and is the least severe of the three services.

Special Education Speech/Language: A special education service that provides instruction in five primary areas: articulation, language development, fluency, voice disorders, and/or auditory processing. Initial entering criteria are based on 1) referral to the Committee of Special Education, 2) parental consent, 3) a score below the 15th percentile on any subtest of the Clinical Evaluation of Language Fundamentals-R Screen and the Joliet 3-Minute Screen, and 4) assessments of the impact the identified impairment has on the student's overall academic progress and social and emotional behavior. Additional testing is then conducted based on one of the five areas in which the student is receiving support.

Special Education Reading and Writing: A special education service that offers intensive supplemental support in Language Arts. Entering criteria are based on 1) referral to the Committee of Special Education, 2) parental consent, and 3) a discrepancy score of 15 or more points between verbal and performance subscores on the WISC III-R test.

Summary

As educators attempt to meet the needs of a diversified student population, learning styles teaching offers an individualized approach to education. Since research has shown that teaching to students' preferred learning styles is effective, it is difficult to deny the need for more research in this area. Because students in need of academic assistance should be a major concern to classroom teachers and educators, understanding each student's preferential way of learning is valuable. As traditional American classrooms continue to fail to meet the needs of all learners, additional efforts must be turned to those students whose needs we are failing to address. Learning styles teaching is offered as a partial solution.

Chapter II

REVIEW OF THE LITERATURE

Purpose of the Study

The purpose of this study was two-fold: to determine whether there is a significant association between a student's dominant Jungian learning style and the occurrence of academic difficulty, and to determine whether there is a significant association between learning style and the intensity of academic difficulty.

A review of related literature includes the topics of defining learning styles, the validity of teaching to learning styles, Jung's model of learning styles, and the Learning Preference Inventory.

What are learning styles?

There are many conceptual models of learning styles. However, each model shares the fundamental premise that not all people learn the same way (Dunn, DeBello, Brennan, & Murrain, 1981). While integrating insights from biology, anthropology, psychology, medical case studies, and an examination of art and culture, learning styles emphasize the different ways in which people think and feel when solving problems, creating products, and interacting (Silver,

Strong, & Perini, 1997). Dunn defines a person's learning style as "...the way he or she concentrates on, processes, internalizes, and remembers new and difficult academic information or skills," (Shaughnessy, 1998, p. 141).

While definitions and terms differ across models, all models share two common elements: a focus on process (how individuals absorb and think about information and evaluate results) and an emphasis on personality (personal, individualized act of thought and feeling) (Silver, Strong, & Perini, 1997). Researchers and theorists contend that as people live and learn, they develop, practice, and utilize a mixture of styles. That is, although people demonstrate a preference for a particular style, this preference does not preclude the use of other learning styles from time to time.

There is also evidence suggesting that a large proportion of an individual's learning style is biologically determined (Restak, 1979). Thus, the notion that students should adapt to their teachers' styles disregards the biogenetic nature of learning styles (Dunn, Beaudry, & Klavas, 1989).

Teaching to learning styles: The evidence

Despite the number of models and the differences among them, research overwhelmingly supports the conclusion that teaching to students' learning styles works. Carbo, Dunn, and Dunn (1986) demonstrated that matching student learning style with the corresponding teaching strategy improves students'

abilities to concentrate and to learn. Andrews (1990) reports an increase from the 30th percentile to the 83rd percentile over three years from a North Carolina elementary school on the California Achievement Tests after responding to students' learning styles.

Many studies regarding learning styles have been conducted with at-risk students as well. Researchers have found that most at-risk students have learning styles that differ from those styles required to succeed in traditional educational systems, and that accommodating these students' learning styles has consistently increased academic achievement and alleviated behavior problems (Sudzina, 1987, as cited in Carbo & Hodges, 1988).

Over the course of one year, LaShell (1986, as cited in Carbo & Hodges, 1988) found a gain of 17 months in reading comprehension for disabled students whose learning styles were matched with instruction, compared to only a four-month gain for students whose learning styles were not matched with instruction. Brunner and Majewski (1990) studied a district in which a passing rate of only 25 percent of special education high school students on the required local examination was reported. Once a learning styles program was employed, that passing number rose to 66 percent in the first year and 91 percent in the second. The results remained constant at 90 percent in the third year (Brunner & Majewski, 1990).

Perrin (1990) also reported significant improvements for a group of at-risk students who participated in a learning styles program. Students were selected for the program based on three criteria: failing grades in two or three subjects, scores below the sixth stanine on a standardized reading test, and excessive absence. From grades 10 to 12, these students were grouped together for math, social studies, English, reading, and science and taught to their *individual* learning styles. At the end of tenth grade, all students passed their English, social studies, math, and science courses. Grade point averages for theses students showed a mean increase of 18 points in English, eight in social studies, four in math, and 10 in science as compared to their averages at the end of ninth grade. Later in the program, more than half of these students applied to colleges (Perrin, 1990).

Other studies on at-risk student populations revealed an ability for these students to pass state tests when a learning style approach was used in the classroom. A group of 34 students who had failed the Texas state minimum skills test of reading, writing, and math were taught with the learning styles approach for an eight month period. At the end of the program, all 34 students passed the state exam. In another program, students whose class averages in Algebra II were below 50 percent at the end of the first six weeks, were instructed according to their learning styles. At the end of the year, 32 out of the 34 students in the program passed the course (Orsak, 1990).

In addition, Stone (1992) reported that learning disabled elementary school students from a North Carolina school, in a four month period, showed a gain of four months on a standardized achievement test after teaching to learning styles. This rate of growth exceeds the typical growth for learning disabled students. Similarly, Dunn (1990) reported that 64 percent of eighth and ninth grade students in a reading program showed four months or more of growth over the study period, compared to only 12 percent before learning styles instruction had been employed.

Jung's Model of Learning Styles

Learning-style theory has its roots in psychoanalytic theory, beginning with Carl Jung. According to Jung (1921/1971), the term "psychological type" can be explained as the way in which people prefer to perceive and to judge the information they encounter as they go through life adapting to situations. Jung's *psychological type* is descriptive of what is now called *learning style*. Jung's model is based on classes of behavior he found to be common to some people, but not to all. He characterized typical differences based on attitude, perception, and judgment (Bargar & Hoover, 1984). This classification of learning style is based on two dimensions of thinking: perception (sensing or intuition) and judgment (thinking or feeling).

The functions of sensing and intuition are used to explain how people prefer to perceive what they are experiencing. Sensing, as a preferred way of perceiving information, describes people who tend to deal realistically and precisely with tasks. These types prefer experience to theory, and are good at handling facts and details. Intuitive types, on the other hand, perceive information holistically. Because of this, they often lose sight of details. In their interests, intuitive learners can seem theoretical and creative, however, they can also be seen as impatient and imprecise (Bargar & Hoover, 1984).

The functions of thinking and feeling are used to explain how people rationalize or judge perceived information. Judgments made in the thinking mode are usually logical and impersonal. Jungian thinkers provide valuable constructive criticism, but are often viewed as cold and impersonal because of their objective, rather than subjective approach to most situations. In contrast, judgments made in the feeling mode usually focus on values rather than logic. Feelers are just as rational as the thinkers, but prefer to judge information against a hierarchy of values. Feeling types are usually viewed as thoughtful and considerate, and tend to relate to others in a personal and sympathetic manner (Bargar & Hoover, 1984). Interestingly, Lawrence (1982) found that in terms of perception, sensing is more commonly found among people than intuition.

In putting the model altogether, it is important to understand that each descriptor is a dichotomy. Sensing is the polar opposite of intuition and thinking

is the opposite of feeling. Thus, sensing and intuition cannot function at the same time nor can thinking and feeling. This, therefore, results in a general typology consisting of four psychological types: sensing-thinking, sensing-feeling, intuitive-thinking, and intuitive-feeling (see Appendix A). Interestingly, Jung's theory contends that all people possess all four functions (sensing, intuition, thinking, and feeling), and that psychological type and behavior are determined by the relative predominance of one over the other (Bargar & Hoover, 1984). Jung's model also includes two attitudes: introversion and extroversion, but because these descriptors are not part of the present study, there is no discussion of them here. In an attempt to combine each of the four descriptors, the following offers characteristics and effective teaching strategies for each of the four personality types.

Sensing-thinking learners are practical, realistic, and "matter-of-fact." They are efficient and results-oriented. Sensing-thinkers prefer action and involvement to words and theory. They prefer simple, concise, and to-the-point directions and right/wrong questions. Competition, grades, and awards are what motivate sensing-thinkers. They seek practical solutions to immediate problems, tend not to procrastinate, and are efficient. Suggested teaching strategies for sensing-thinking learners include programmed instruction, command-style teaching, memorization, drill, and repetition (Silver & Hanson, 1984).

Intuitive-thinkers are the most intellectual of the four types. They prefer to learn theoretically and enjoy complex problems and long-term solutions and consequences. Analytical, rational, cynical, and critical describe their thought processes. Intuitive-thinkers always ask "Why?" questions. These learners strive for perfection and enjoy playing the role of "Devil's Advocate." Useful teaching strategies for these learners include inquiry training, concept formation, and problem-solving (Silver & Hanson, 1984).

Sensing-feelers prefer to learn pragmatic issues that affect people's lives, rather than impersonal facts or theories. They enjoy helping others, and need praise and reassurance to maintain their interest. The ability to work well in groups and consider others' points-of-view are their primary strengths. These types of learners can be hurt easily and are reluctant to change. They may have difficulty planning ahead or being objective. They may be disorganized or messy, and tend to read, write, and possess artistic talents. Effective teaching strategies for sensing-feeling learners are group investigations, classroom meetings, peer tutoring, and team games (Silver & Hanson, 1984).

Intuitive-feelers are curious, insightful, imaginative, and creative. They dare to dream, are committed to values, open to alternatives, and search for unusual ways of self-expression. "What if?" questions intrigue them, as opposed to schedules and deadlines. Intuitive-feelers often comment on aesthetic values, beauty, and symmetry, versus the practicality of a theory. These learners usually

start more projects than they finish and are interested in things that *could* happen, rather than things that *have* happened. Recommended teaching strategies for these learners include non-directive teaching, problem-solving, moral dilemmas, and the use of simile questions (e.g.: How is a beaver like a construction worker?) (Silver & Hanson, 1984).

Schooling traditionally emphasizes instruction that meets the needs of learners in the sensing-thinking and intuitive-thinking categories. Research conducted on gifted students in grades three through five indicated that these children are predominantly intuitive (Hanson, Silver, & Strong, 1984). Similarly, McCaulley (1975) found 83.5 percent of all Merit Scholarship winners to be intuitive-thinkers. Hanson and Silver (1978) found students in grades 6 through 8 with the highest California Achievement Tests mean scores in math and language arts were intuitive-thinkers. There is a converging consensus that intuitive-thinkers are generally among the better students, especially at the secondary and college levels (Hanson, Silver & Strong, 1991).

Because the learning styles of sensing- and intuitive-feelers are somewhat neglected in traditional school settings, these types of learners are thought to be at risk (Hanson, et al., 1991). While sensing-feeling learners do well in school in the first four grades (K-3) (Hanson, et al., 1991), this group of learners has been identified as being at greater risk in their later years of schooling. Natter and Rollins (1974) also identified sensing-feeling learners as the most common at-risk

type and estimated that an astounding 99.6 percent of high school drop-outs were sensors.

The Learning Preference Inventory (LPI)

Beaty (1986, as cited in Shaughnessy, 1998) contends that students' learning styles cannot be accurately identified by teachers without an objective instrument. "The LPI is designed to assist teachers in the task of identifying individual student learning preferences and styles", (Silver & Hanson, 1984, p. 7). This diagnostic tool is a 144-item self-report, paper and pencil indicator which assesses individual preferences for perception and judgment. It is based on Jung's theory, the behavioral definitions of the Myers-Briggs Type Indicator, and the developers' observations of over a thousand students (Silver et al., 1984).

The actual instrument consists of 35 single sentence stems and asks respondents to rank four sets of responses to each stem. The respondents rank order their preferred responses (see Appendix B for sample LPI). Factor analysis of each item stem indicates that there is strong evidence that the Learning Profile Inventory adequately assesses Jung's four learning types (Silver et al., 1984).

Summary

This chapter reviewed some of the available literature on learning styles, specifically, what learning styles are, their validity, Jung's model of learning styles, and an instrument used in identifying learning styles (the LPI).

The review of the literature showed that teaching to learning styles can be effective in increasing student achievement for both regular and learning disabled students. Because Jung's psychological type theory is widely used and accepted, a detailed description of the theory was given, along with specific descriptors for each of the four learning styles. The Learning Preference Inventory was also described, and the validity of this instrument was cited.

CHAPTER III

DESIGN OF THE STUDY

Purpose of the Study

The purpose of this study was two-fold: to determine whether there is a significant association between a student's dominant Jungian learning style and the occurrence of academic difficulty, and to determine whether there is a significant association between learning style and the intensity of academic difficulty.

Null Hypotheses

The first null hypothesis, "There is no statistically significant association between learning style and the occurrence of academic difficulty," was tested against the alternative hypothesis, "There is a statistically significant association between learning style and the occurrence of academic difficulty."

The second null hypothesis, "There is no statistically significant association between learning style and the intensity of academic difficulty," was

tested against the alternative hypothesis, "There is a statistically significant association between learning style and intensity of academic difficulty."

Methodology

Participants

This study involved 30 third and fourth grade students from a public, multiage, elementary school in Central New York. Fifty-five percent of the participants were female, and the entire sample was Caucasian. Students ranged in age from eight to 10 years, with a mean age of 8.7.

Materials and Procedures

Learning style

The Hanson Silver Learning Preference Inventory (LPI)(1991) was used to assess students' learning styles because it is the only standardized assessment of the aforementioned Jungian model of learning styles. The LPI is a 144-item assessment of how students perceive themselves as learners. Once coded, the LPI yields a score ranging from 0 to 125 for each of Jung's four learning styles. Although the primary function of the assessment is to determine one's *dominant* learning style, the LPI also identifies one's *auxiliary, supporting,* and *least-used* styles (their second, third, and fourth preferred styles, respectively).

Academic difficulty

Students' cumulative files were mined in order to 1) determine whether students had ever received additional academic services and 2) to determine the nature and intensity of the services rendered (see Appendix C for a copy of the coding sheet). This particular district offers services for three types of academic/developmental difficulty: minor reading deficits, speech and language deficits (special education), and severe reading and writing difficulty (special education).

Students with minor reading problems are placed in a supplemental remedial reading program. Eligibility is based on teacher recommendation and/or scoring below the 50th percentile on the New York State assessment protocol. This is the least severe of the three services. Students with speech and language problems are placed in a special education program that provides instruction in five primary areas: articulation, language development, fluency, voice disorders, and/or auditory processing. Eligibility is based on 1) teacher referral, 2) parental consent, 3) a score below the 15th percentile on any sub-test of the Clinical Evaluation of Language Fundamentals-R Screen, and 4) assessments of the impact the identified impairment has on the student's overall academic progress and social and emotional behavior. Students with severe reading and writing difficulties are placed in a special education program that offers intensive supplemental support in Language Arts. Entering criteria is based on 1) teacher

referral, 2) parental consent, and 3) a discrepancy of 15 or more points between the verbal and performance subscales of the WISC III-R test. In many cases, students received all three services.

Confirmatory interviews were conducted with each student's current teacher and the school's academic support staff in order to ensure that accurate information was gathered from the cumulative files.

Statistical Analysis

The above information was recorded and entered into a statistical computer program (SPSS, version 8.0). A combination of Analysis of Variance (ANOVA) and Chi-square analytic techniques were used to address the primary research questions – ANOVAs when the dependent variables were continuous and Chi-squares when the dependent variables were categorical.

Chapter IV

ANALYSIS OF THE DATA

Purpose of the Study

The purpose of this study was two-fold: to determine whether there is a significant association between a student's dominant Jungian learning style and the occurrence of academic difficulty, and to determine whether there is a significant association between learning style and the intensity of academic difficulty.

Results

Descriptive statistics and gender differences

Table 1 presents the frequencies for the four Jungian learning styles as they appeared in each of the four student preferences (i.e., dominant, auxiliary, supporting, and least-used). Sensing-Feeling clearly emerged as the most common *dominant* learning style (53.3%), and exactly two-thirds of the participants were *dominant* Sensors. The least common *dominant* styles were Sensing- and Intuitive-Thinking (13.3% each). As for the *least-used* learning styles, Intuitive-Thinking was the most common (40%), and Intuitive-Feeling was the least common (6.7%).

Table 1. Frequency of the 4 learning styles for 4 categories of preference.

		Dominant	Auxiliary	Supporting	Least-Used
Sensing – Thinking	n (%)	4 (13.3)	7 (23.3)	11 (36.7)	8 (26.7)
Sensing – Feeling	n (%)	16 (53.3)	2 (6.7)	4 (13.3)	8 (26.7)
Intuitive – Thinking	n (%)	4 (13.3)	8 (26.7)	6 (20.0)	12 (40.0)
Intuitive – Feeling	n (%)	6 (20.0)	13 (43.3)	9 (30.0)	2 (6.7)

Table 2 presents the mean scores on each of the four subscales of the LPI broken down by gender. The raw data revealed a pattern suggesting that boys outscored girls on the Feeling subscales and that girls outscore boys on the Thinking subscales. However, when independent-samples t-tests were performed in order to test the strength of this trend, no significant gender differences emerged (all $p > 0.05$).

Table 2. Mean LPI scores by gender.

	Gender	Mean	Std. Deviation
Sensing-Thinking	Male	41.6429	9.8731
	Female	43.1250	10.6701
Sensing-Feeling	Male	53.1429	16.7417
	Female	49.5625	17.2432
Intuitive-Thinking	Male	36.2143	11.7812
	Female	39.0625	14.3502
Intuitive-Feeling	Male	48.7143	9.7856
	Female	46.7500	9.8961

Table 3 summarizes the academic difficulty data and contains a number of significant gender differences. Relative to girls, boys received academic support services at an increased rate ($\chi^2 = 8.103$, df = 1, $p<0.01$), and they received quantifiably more services ($t = 4.63$, df = 28, $p < 0.001$). Boys were more likely to be enrolled in special education services ($\chi^2 = 11.855$, df = 2, $p<0.01$) and on average received services for a longer duration ($t = 4.08$, df = 28, $p<0.001$). *Minor services* refer to cases in which only supplementary support for minor reading difficulty was needed. *Severe services* refer to cases in which one or both of the special education services was deemed more appropriate for the child's special needs.

Table 3. Simple descriptives for males and females on two multicategorical and two continuous measures of academic difficulty.

		Male	Female	Overall
Ever received academic services				
Yes	n (%)	13 (93)	7 (44)	20 (66)
No	n (%)	1 (7)	9 (56)	10 (33)
Service Severity				
None	n (%)	1 (7)	9 (56)	10 (33)
Minor	n (%)	5 (36)	6 (38)	11 (37)
Severe	n (%)	8 (57)	1 (6)	9 (30)
Number of years enrolled in services	M	3.57	0.88	2.1
	Std. Dev	2.3	1.2	2.2
Number of services received	M	1.86	4.4	1.1
	Std. Dev	1.1	5.1	1.1

Dominant learning style and academic difficulty

Pearson Chi-square analyses were conducted in order to determine if any of the Jungian learning styles, if dominant, were associated with the presence or absence of *any* academic difficulty (occurrence). The 2 x 4 cross tabulation yielded no significant differences between the styles and the occurrence of academic difficulty. Further analyses also suggest that dominant Jungian learning style is unrelated to 1) the severity of services received, 2) the number of years a student receives services, and 3) the number of services he or she receives (severity, duration, and pervasiveness of services respectively).

Least-used learning style and academic difficulty

Pearson Chi-square analyses were conducted in order to determine if a student's "least-used" Jungian learning style was associated with the occurrence of academic difficulty, and no significant differences emerged. However, a cross tabulation of *least used* style x service severity (4 x 3) yielded highly significant results ($\chi^2 = 16.16$, df = 6, $p<0.01$). As can be seen in Figure 1, when intuitive-feeling is a student's *least-used* learning style, he or she receives disproportionately more severe academic services.

Figure 1. Severity of services associated with each of four *least-used* learning styles.

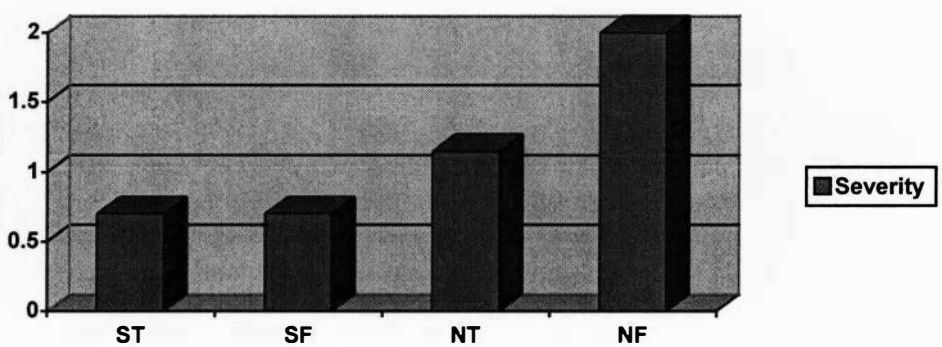


Figure 2 shows the duration of services associated with each of the four *least-used* styles. A single factor ANOVA yields a highly significant group difference in this regard ($F = 5.592$, df = 3,26, $p<0.01$). Tukey's HSD post hoc

analysis suggests that students only differ on the mean number of duration of services if their *least-used* style is intuitive-feeling (family error rate set at α=0.05).

Figure 2. Duration of services associated with each of four *least-used* learning styles

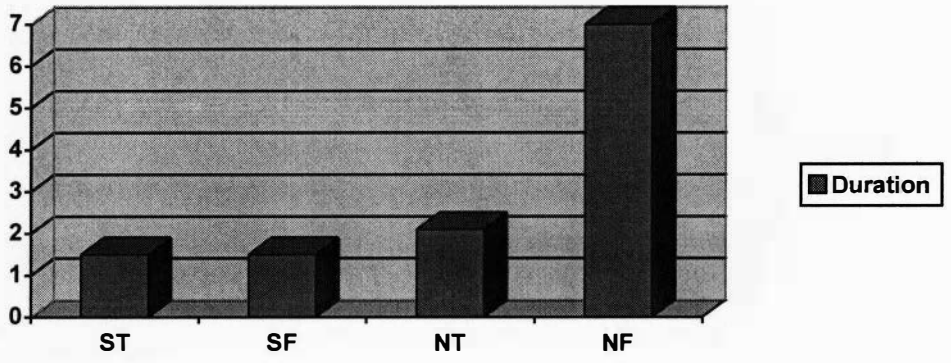
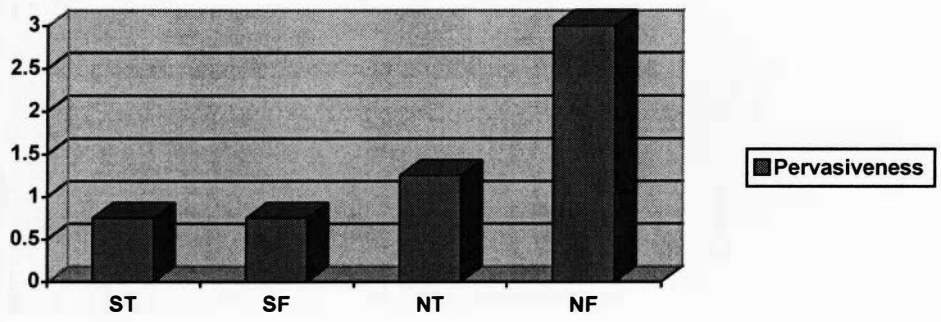


Figure 3 shows the pervasiveness of academic services for each of the four *least-used* Jungian styles. In conjunction with a second Tukey's post hoc analysis, a one-way ANOVA for number of services received ($F=3.244$, $df=3,26, p<0.05$) suggests that students whose *least-used* style is intuitive-feeling have the most pervasive academic difficulties.

Figure 3. Pervasiveness of services associated with each of four *least-used* learning styles



Summary

Results of this study indicated that sensing-feeling was the most common *dominant* learning style and the majority of the participants were *dominant* sensors. Sensing-thinking and intuitive-thinking were the learning styles found to be the least common *dominant* styles. In terms of *least-used* learning style, intuitive-thinking was the most common, and intuitive-feeling was the least common.

No significant differences were found among *dominant* learning style and gender, although in terms of academic difficulty, many gender differences emerged. All three categories of intensity of academic support (severity, duration, and pervasiveness) were much more common among boys than girls.

In searching for an association between *dominant* learning style and the occurrence and intensity of academic difficulty, no significant associations were found. Results indicated that *least-used* learning style was unrelated to the occurrence of academic support, but significantly related to all three categories of intensity. Academic support services were most severe, pervasive, and of longest duration when a student's *least-used* style was intuitive-feeling.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

Purpose of the Study

The purpose of this study was two-fold: to determine whether there is a significant association between a student's dominant Jungian learning style and the occurrence of academic difficulty, and to determine whether there is a significant association between learning style and the intensity of academic difficulty.

Conclusion

Every classroom contains a diverse population of students, especially in terms of academic ąbility and performance. Learning styles teaching, as an individualized approach to education, has been offered as a partial solution to meet the needs of all students. Previous research supports the effectiveness of matching learning style and instruction to increase regular and learning disabled students' achievement.

Results of the present study indicate that among the four Jungian learning styles, sensing-feeling was the most common *dominant* learning style. In terms of perception, the majority of the participants were dominant sensors. This supports

Lawrence's (1982) finding that sensing is more common than intuiting. Intuitive-thinking emerged as the most common *least-used* style. Because no work was found regarding least-used Jungian learning styles, this finding cannot be juxtaposed with the existing learning style literature.

Results from this study also showed that regardless of Jungian learning style, boys showed significantly higher rates of academic difficulty. That is, they received additional academic services at a rate significantly higher than girls. Additionally, boys were found to experience more intense academic difficulty than their female counterparts. When boys received academic support services, they received quantifiably more services and more *severe* services over a longer period of time. Gender differences in the rate at which students receive academic services is a common finding in the literature (Anderson, 1997), with most studies corroborating the present finding that boys receive services at a higher rate than girls. (Vogel, 1990).

Surprisingly, *dominant* learning style, in this sample, was unrelated to the occurrence, duration, severity, and pervasiveness of academic difficulty. Previous research in this area sought to find an association between *dominant* learning style and academic achievement, usually in the form of standardized test scores (e.g., Andrews, 1990; Perrin, 1990). Other researchers have looked for an association between *dominant* learning style and giftedness among elementary students (e.g., Hanson & Silver, 1978; McCaulley, 1975), but none have investigated a potential

link between learning style and academic difficulty in this age group. The present effort found support for neither primary research hypothesis.

Least-used Jungian learning style yielded a significant association with academic difficulty. While there was no significant association found between *least-used* learning style and the occurrence of academic difficulty, there was a significant association between the *least-used* style and all three categories of intensity for intuitive-feelers. In terms of service severity, when intuitive-feeling is the *least-used* learning style, those students are more likely to require special education services and it is less likely that support from remedial services will adequately address their needs. For the category of duration, it was found that when intuitive-feeling is the *least-used* learning style, those students require services longer than those students whose *least-used* learning style is sensing-thinking, sensing-feeling, or intuitive thinking. In terms of pervasiveness, results indicated that those students whose *least-used* learning style is intuitive-feeling receive a greater number of services than those students whose *least-used* style is not intuitive-feeling.

Implications for Education

The results from this study have many important implications for education. First, sensing-feeling was found to be the most dominant Jungian learning style. As the literature supports that these types of learners are the most

at-risk of the four types (Hanson, Silver, & Strong, 1991; Natter & Rollins 1974), educators should design their classrooms to predominantly meet the needs of sensing-feeling learners. This would include offering learning experiences to include strategies such as group investigations, classroom meetings, peer tutoring, and team games (Silver & Hanson, 1984).

While the majority of the participants in this study and others (Lawrence, 1982) were also found to be sensors, educators can again design their classrooms to fit the needs of this preferential way of perceiving knowledge. Sensors perceive knowledge in terms of facts and details and prefer experience to theory (Bargar & Hoover, 1984). While the majority of students may fall into this category, educators can not ignore the needs of those who perceive information intuitively.

In terms of gender, the interesting trend that emerged from this study was that boys had a higher scored higher in terms of both occurrence and intensity in terms of academic support than girls. Although the present study did not include gender among the hypotheses, it brings up an interesting look at gender and learning disabilities. There is a wealth of literature concerning gender and special education that all educators may find interesting.

Implications for Research

While literature on Jungian learning styles and academic growth exists, little work has been done concerning learning styles and academic difficulty. Also, few research studies have been conducted on primary and intermediate aged students. This study investigated the association between learning style and academic difficulty for third and fourth grade students. More research needs to be conducted in this area with similar aged participants to conclude any significant trends.

A limitation of this study was the general sample size of 30 students. Occurrence of academic services was found among two-thirds of the sample. Had the sample size been larger and contained a more heterogeneous population of occurrence of academic services, perhaps more trends would have been found among *dominant* learning style and additional academic support. In addition, generalizations of the results for *least-used* learning style is cautioned because the primary conclusions concerned students whose *least-used* style was intuitive-feeling, a sub-group represented by only two students in the present sample. Further research in this area needs to be conducted on a larger sample with a more heterogeneous group of ability.

Learning styles theory itself is seen as having a few limitations, as it fails to address how context and purpose affect learning. Specifically, the theory of

learning styles does not recognize how learning styles may vary in different content areas and disciplines. Also, the theory neglects the effects that context has on learning (Silver, Strong, & Perini, 1997). In discussing learning styles theory, Gardner's theory of multiple intelligences also often comes to the minds of educators. Perhaps that is because Gardner's theory seems to pick up where learning styles theory leaves off. Multiple intelligence theory focuses on the content of learning and its relation to the disciplines. While multiple intelligence theory also contains its own set of limitations, it is proposed that by integrating the two theories, learning styles and multiple intelligences, learners can acquire new information in many ways, rather than just in the areas of their strengths Silver, et al., 1997). Research in the area of integrating two such theories may also offer new insight into helping students learn more effectively, the aspiration of every educator.

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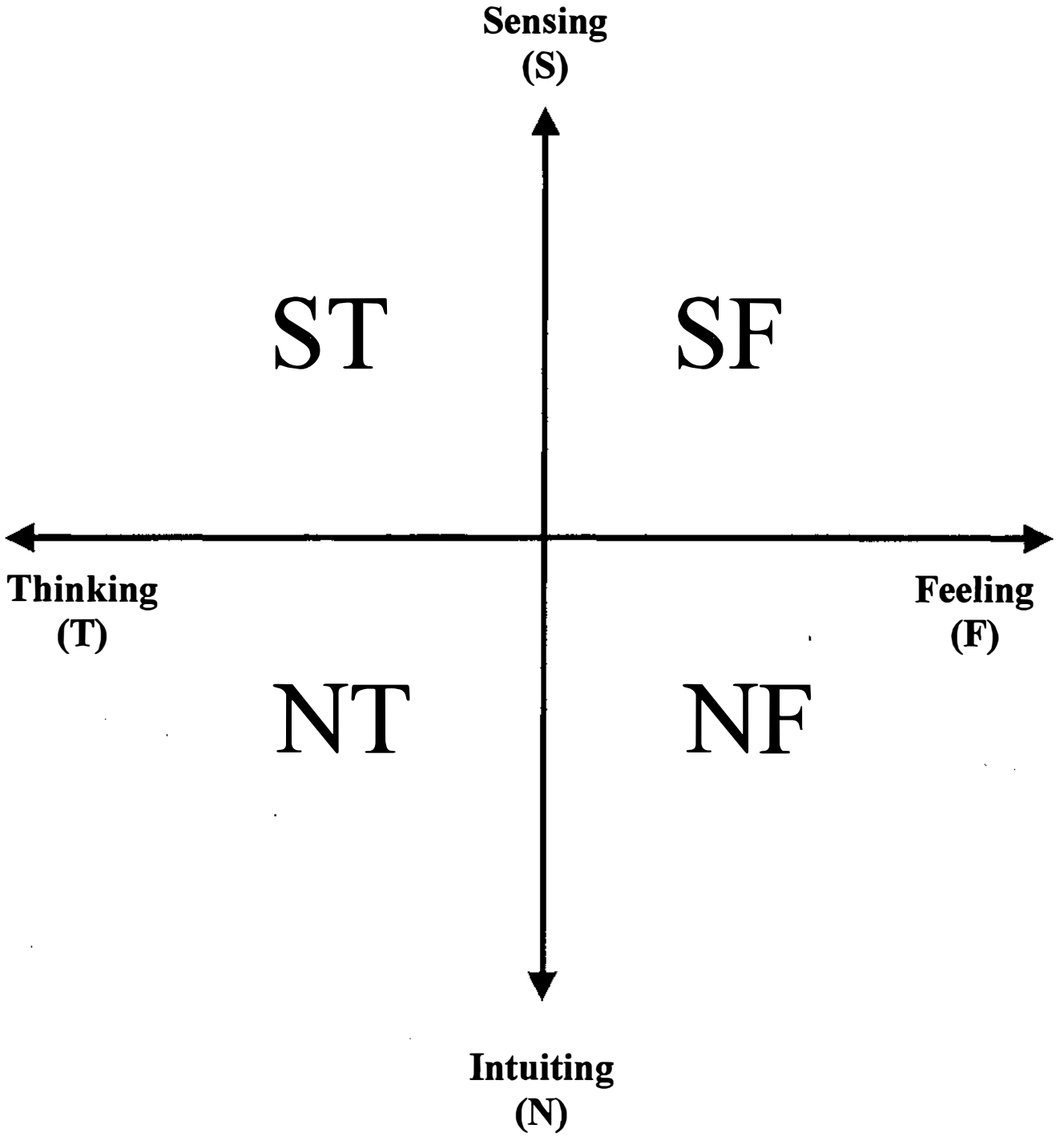
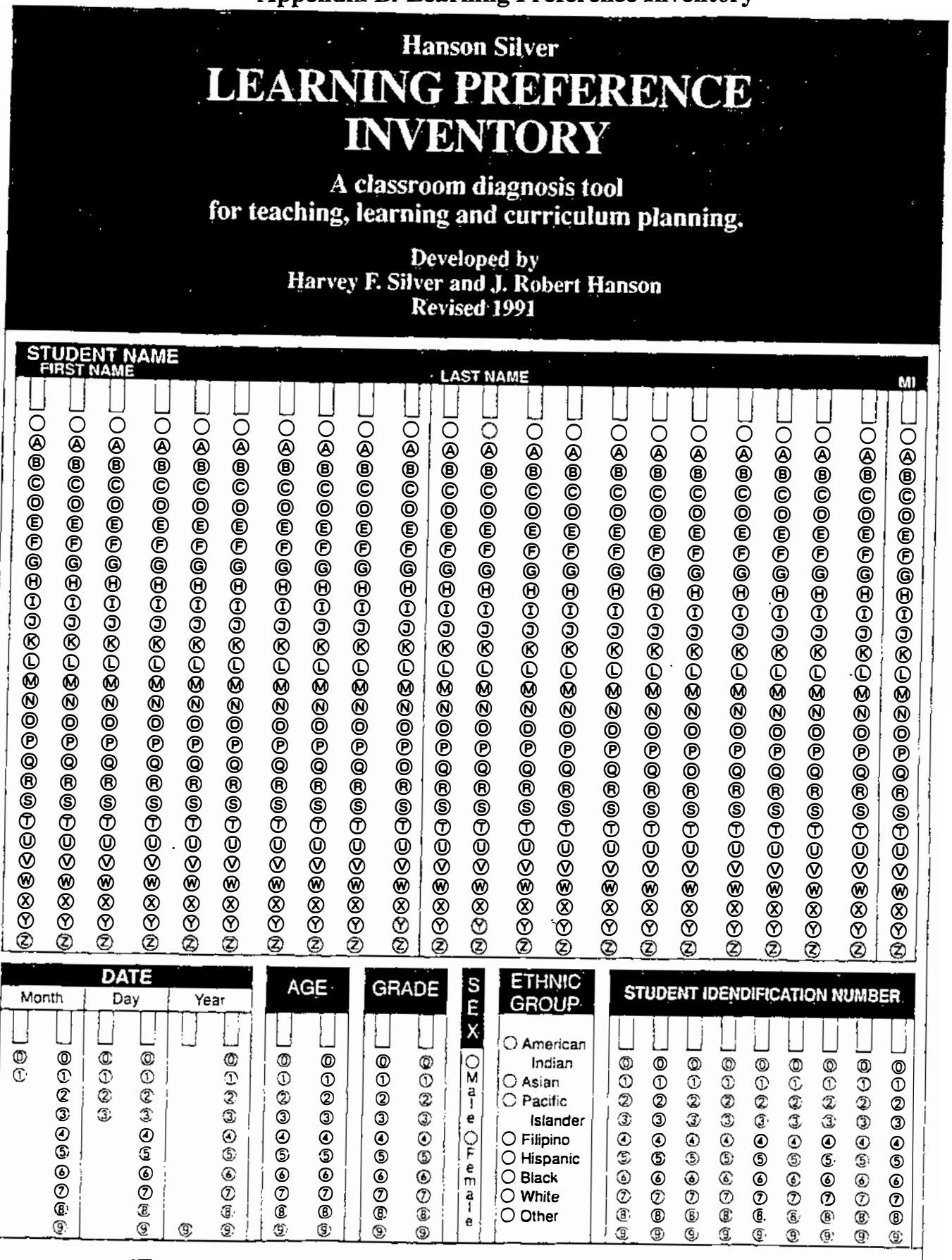
Appendix A: Jung's Two Dimensional Learning Styles Model



Appendix B: Learning Preference Inventory



Hanson Silver

LEARNING PREFERENCE INVENTORY

A classroom diagnosis tool
for teaching, learning and curriculum planning.

Developed by
Harvey F. Silver and J. Robert Hanson
Revised 1991

STUDENT NAME
FIRST NAME
LAST NAME
MI

DATE
Month
Day
Year

AGE

GRADE

SEX
Male
Female

ETHNIC GROUP
- American Indian
- Asian
- Pacific Islander
- Filipino
- Hispanic
- Black
- White
- Other

STUDENT IDENDIFICATION NUMBER

PLEASE DO NOT MAKE ANY STRAY MARKS IN THIS SHADED AREA

109899

HANSON SILVER STRONG & ASSOCIATES INC.

Institute for Cognitive and Analytical Studies
10 West Main Street, Moorestown, NJ 08057

INTRODUCTION

Knowing more about how one learns makes schooling more enjoyable and the learning experience more effective. Information from Hanson-Silver Learning Preference Inventory helps you and your teachers make better decisions about learning and teaching.

The Learning Preference Inventory is not a test. There are no right or wrong answers. There is no time limit. And, it is not a reading test. So, if you're having trouble with a word or phrase, please ask your teacher for help.

DIRECTIONS FOR RESPONDING

The Learning Preference Inventory (LPI) is made up of 36 statements followed by four choices with four circles in front of each choice numbered 1-4. For each of the statements rank order for four choices. Fill in the circle in the choice for your first choice with the 1 bubble, mark only one circle in each choice. Continue on till you have made 4 choices. See Example:

1. I prefer learning something new by

①	②	●	④ reading a book	(Third Choice)
●	②	③	④ watching a movie	(First Choice)
①	②	③	● making a project	(Fourth Choice)
①	●	③	④ working with a friend	(Second Choice)

The most important thing to remember is to rank each answer according to how you feel, not how you think you ought to feel. Make your own choices based on your best judgment.

1. I'm good at
- ① ② ③ ④ helping others
- ① ② ③ ④ getting things done
- ① ② ③ ④ organizing things
- ① ② ③ ④ discovering things

2. I like questions that ask me
- ① ② ③ ④ to think of new and original ideas
- ① ② ③ ④ to explain why things happen
- ① ② ③ ④ to choose the correct answer
- ① ② ③ ④ how I feel about things

3. In a group I am usually
- ① ② ③ ④ quiet
- ① ② ③ ④ noisy
- ① ② ③ ④ talkative
- ① ② ③ ④ listening

4. When I'm making something I prefer to
- ① ② ③ ④ have someone show me how to do it
- ① ② ③ ④ follow the directions one step at a time
- ① ② ③ ④ figure out how to do it by myself
- ① ② ③ ④ find a new way for doing it

5. I would like to be in
- ① ② ③ ④ music, painting or writing
- ① ② ③ ④ science, math or law
- ① ② ③ ④ business, politics or construction
- ① ② ③ ④ sales, social work or nursing

6. As a person I tend to
- ① ② ③ ④ be hard to get to know
- ① ② ③ ④ talk easily about my feelings and ideas
- ① ② ③ ④ be easy to get to know
- ① ② ③ ④ keep my thoughts and feelings to myself

7. I work best when
- ① ② ③ ④ I'm having fun
- ① ② ③ ④ I know exactly what I have to do
- ① ② ③ ④ I'm finding a solution to a problem
- ① ② ③ ④ I can choose what I want to learn

8. I like assignments or activities which involve
- ① ② ③ ④ taking ideas and changing them into something new and different
- ① ② ③ ④ searching for solutions to problems
- ① ② ③ ④ copying or making things
- ① ② ③ ④ sharing my feelings and ideas

9. When I'm working I tend to
- ① ② ③ ④ be careful
- ① ② ③ ④ do things quickly
- ① ② ③ ④ be impatient with work that takes a long time
- ① ② ③ ④ work with something that takes a long time

GO ON TO NEXT PAGE ⟶

THANK YOU FOR NOT MAKING STRAY MARKS IN THIS AREA

10. When I have a difficult assignment I like to

① ② ③ ④ talk with others to see what needs to be done
① ② ③ ④ memorize or practice what needs to be done
① ② ③ ④ think things through for myself before someone explains it to me
① ② ③ ④ find new or different ways of doing the assignment

11. I enjoy

① ② ③ ④ doing things I've never done before
① ② ③ ④ reading about things that interest me
① ② ③ ④ doing things I know about and can do well
① ② ③ ④ working with friends

12. I like

① ② ③ ④ quiet places where I can think
① ② ③ ④ noisy and crowded places where lots of things are happening
① ② ③ ④ doing lots of different things at the same time
① ② ③ ④ doing one thing at a time

13. I prefer games that

① ② ③ ④ everyone can play and where no one loses
① ② ③ ④ are fast, have a lot of action, and where someone wins
① ② ③ ④ make me thing ahead about what to do (Chess, Stratego, etc.)
① ② ③ ④ require me to use my imagination

14. I would like to

① ② ③ ④ create art, music or dance
① ② ③ ④ invent or discover something
① ② ③ ④ make a lot of money
① ② ③ ④ help other people

15. When working on an assignment I prefer working

① ② ③ ④ in a quiet place
① ② ③ ④ in a group with other people
① ② ③ ④ in a place where I can talk and share with other people
① ② ③ ④ by myself

16. People who know me well would say I'm mostly

① ② ③ ④ caring, friendly and helpful
① ② ③ ④ neat, fast and accurate
① ② ③ ④ logical, sensible and intelligent
① ② ③ ④ creative, enthusiastic and imaginative

17. In school the most important thing to me is

① ② ③ ④ using my ideas and imagination
① ② ③ ④ learning how to think and reason for myself
① ② ③ ④ getting good grades
① ② ③ ④ making friends

18. When I meet new people I

① ② ③ ④ find it difficult to think of good things to say
① ② ③ ④ feel comfortable and talk easily
① ② ③ ④ enjoy talking about myself
① ② ③ ④ feel uncomfortable talking with people I don't know

19. I like to learn about

① ② ③ ④ myself and other people
① ② ③ ④ things I can do and use
① ② ③ ④ important ideas and why things happen
① ② ③ ④ what life may be like in the future

20. I would like a job where I can

① ② ③ ④ make and do unusual things
① ② ③ ④ read and think
① ② ③ ④ make useful things
① ② ③ ④ work with people

21. When I feel upset I

① ② ③ ④ have difficulty telling others how I really feel
① ② ③ ④ share my feelings easily
① ② ③ ④ usually let everybody know how I feel
① ② ③ ④ keep my feelings to myself

22. When I have a problem I like to

① ② ③ ④ work with a partner
① ② ③ ④ work it out step by step
① ② ③ ④ think about it and then make a plan
① ② ③ ④ find a new way to solve it

23. When I have many assignments to do I

① ② ③ ④ want to move on to something else once I've learned how to do it
① ② ③ ④ think carefully about what needs to be done, and then plan how best to do it
① ② ③ ④ start working right away and finish one assignment before beginning another
① ② ③ ④ take time to talk with others and check my answers while I work

GO ON TO NEXT PAGE ⟶

THANK YOU FOR NOT MAKING STRAY MARKS IN THIS AREA

24. In group activities I
① ② ③ ④ listen to what others have to say before I speak
① ② ③ ④ share my own ideas first and then get reactions
① ② ③ ④ talk a great deal
① ② ③ ④ keep my ideas to myself until I'm asked to speak

25. I like books about
① ② ③ ④ people's feelings and personal problems
① ② ③ ④ real people (biographies), adventure stories, and how to make things
① ② ③ ④ mysteries, science, and stories that explain why things happen
① ② ③ ④ legends, fantasies, and other people's beliefs

26. I like assignments that
① ② ③ ④ are new and different
① ② ③ ④ make me think
① ② ③ ④ I know and can do well
① ② ③ ④ have people working together helping each other

27. I really enjoy
① ② ③ ④ reading and thinking
① ② ③ ④ being with people
① ② ③ ④ talking
① ② ③ ④ writing

28. I am at my best when
① ② ③ ④ working in a group
① ② ③ ④ knowing exactly what to do
① ② ③ ④ finding information and thinking
① ② ③ ④ making up my own ideas

29. I like to
① ② ③ ④ use my imagination
① ② ③ ④ investigate ideas
① ② ③ ④ make something that I can use
① ② ③ ④ hear what other people have to say about themselves or about me

30. When I'm working I prefer to
① ② ③ ④ think a lot before starting
① ② ③ ④ start right away and think about what I'm doing as I go along
① ② ③ ④ do many things at the same time
① ② ③ ④ do one thing carefully before beginning the next

31. My best ideas come from
① ② ③ ④ talking with people
① ② ③ ④ doing things
① ② ③ ④ reading about things
① ② ③ ④ imagining things

32. I prefer teachers who
① ② ③ ④ encourage me to be creative
① ② ③ ④ make me think
① ② ③ ④ teach me how to do useful things
① ② ③ ④ want to be my friend

33. I prefer assignments that
① ② ③ ④ have people working to help each other
① ② ③ ④ I can do quickly and well
① ② ③ ④ make me think, and may take a long time
① ② ③ ④ allow me to express my feelings and use my imagination

34. I prefer to learn by
① ② ③ ④ doing an original project
① ② ③ ④ reading and discovering things for myself
① ② ③ ④ answering questions in a workbook or on worksheets
① ② ③ ④ playing a game

35. I learn best when I can
① ② ③ ④ share my ideas with others
① ② ③ ④ apply skills I've already learned or memorized
① ② ③ ④ look things up and compare ideas
① ② ③ ④ do projects of my own choosing

36. Answering these questions was
① ② ③ ④ fun
① ② ③ ④ frustrating
① ② ③ ④ difficult
① ② ③ ④ easy

THANK YOU FOR COMPLETING THIS INVENTORY
PLEASE ERASE ANY STRAY PENCIL MARKS ON THIS FORM

PLEASE DO NOT MAKE ANY STRAY MARKS IN THIS SHADED AREA

109899

Appendix C: Coding Sheet

Name: _____

Teacher: _____

Demographic Information

Gender: Male Female

Grade: Three Four

Age: 7 8 9 10 11

Learning Style

Learning Preference Inventory (LPI scores):

Sensing Thinking	*Sensing Feeling*	*Intuitive Thinking*	*Intuitive Feeling*
_____	_____	_____	_____

History of Remedial Services

Title I: Grades: K 1 2 3 4

Total number of Years: _____

History of Special Education Services

Resource: Grades: K 1 2 3 4

Total Number of Years: _____

Speech/Lang: Grades: K 1 2 3 4

Total Number of Years: _____